

## Twenty-First Years Breeding Performance of Southern River Terrapin (*Batagur affinis*) at Perak River, Peninsular Malaysia

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### Abstract

The southern river terrapin, *Batagur affinis* (i.e. locally known as “tuntung”) is one of the world’s most critically endangered river turtle inhabiting large rivers and estuaries of southern Thailand and west Malaysia. The present study is conducted at Perak River, Malaysia, whereby it aims to assess the performance of Malaysian government agency known as the Department of Wildlife and National Parks (DWNP) in protecting this species over the past 21 years. The data was collected through observation and secondary sources. In 1996, the species bred in the highest numbers; however, in the following years, the number were decreased dramatically. All in all, the population trends showed that the species numbers are declining and to be endangered. To address these serious issues, some recommendations are proposed in this study.

**Key words:** *Batagur affinis*, breeding performance, decreasing, endangered, recommendation

## 1. Introduction

In Peninsular Malaysia, there are 20 species of freshwater turtles being reported including two introduced species (Ibrahim et al., 2018; Sharma, 1999). One of the freshwater turtle, terrapin, was first described by De Rooy (1917). Since then, research on the history, biology, ecology, and conservation of terrapin has been conducted by Balasingam and Mohammad Khan (1969). In this study, the authors suggested that they have held the law to control this species from extinction. Meanwhile, Shariff (1986) has reviewed the areas in Perak and Terengganu where there are spawning points for the terrapin.

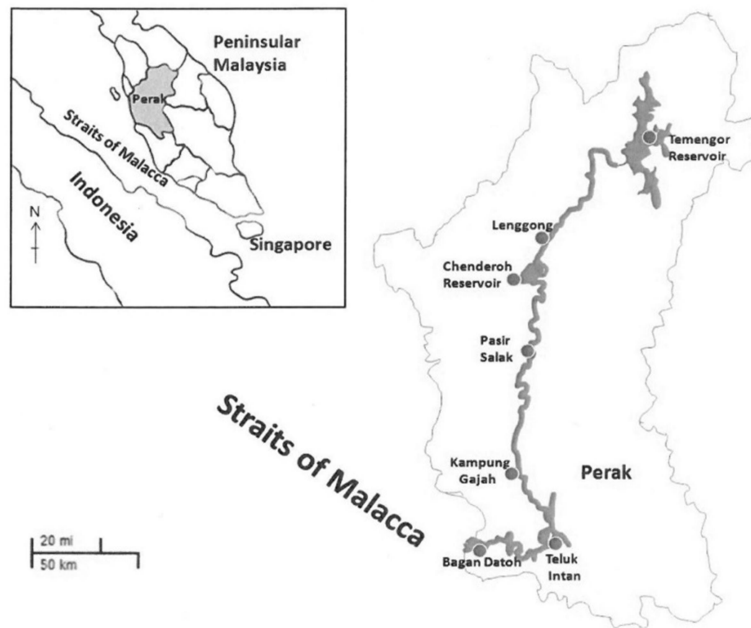
Based on the history, the Malaysian species *affinis* is originated from Aceh, Sumatra, Indonesia, whereby the Sultan of Perak (Sultan Muzaffar Shah) brought these species to Perak in 1528. Sultan Muzaffar Shah built a palace in Teluk Bakong, Bota, Perak, where he released several pairs of *Batagur affinis* into the Silver River (Hanim, 1987). However, according to another study conducted by Loch (1951), the Malaysian river terrapins were claimed to be originated from Japan in the older time.

The nesting season for River Terrapins is generally occurring from late December to early March (Hairul and Shahrul, 2014). Normally, when the female finishes building the nest, it scrapes sand over it and then repeatedly drops her heavy body (approximately 44 lbs.) on it. The resulting “*tun-tonk*” noise was simultaneously made by hundreds of turtles and then gave rise to another name – “*Tuntung*”. Furthermore, the hatchlings are rounded in shape with olive-grey colour while the carapaces are slightly serrated with a low medial keel. However, although all *B. affinis* hatchlings are rounded, they become more elongated as they age (Wirot, 1979).

According to Malaysian law, the Department of Wildlife and National Park (DWNP) is responsible to protect this species. This department built a river terrapin *ex-situ* conservation centre at Bota Kanan near the Perak River, Malaysia, for handling both the captive breeding program and public awareness program. This study aims to assess the performance of Malaysian Government agency known as DWNP in protecting this species over the past 21 years.

## 2. Materials and Methods

The data was collected through observations conducted at study sites (Figure 1) and secondary data retrieved from the DWNP database and reports on *B. affinis* (Figure 2). The statistical analysis has been conducted to obtain means and standard deviations for both nest and eggs.



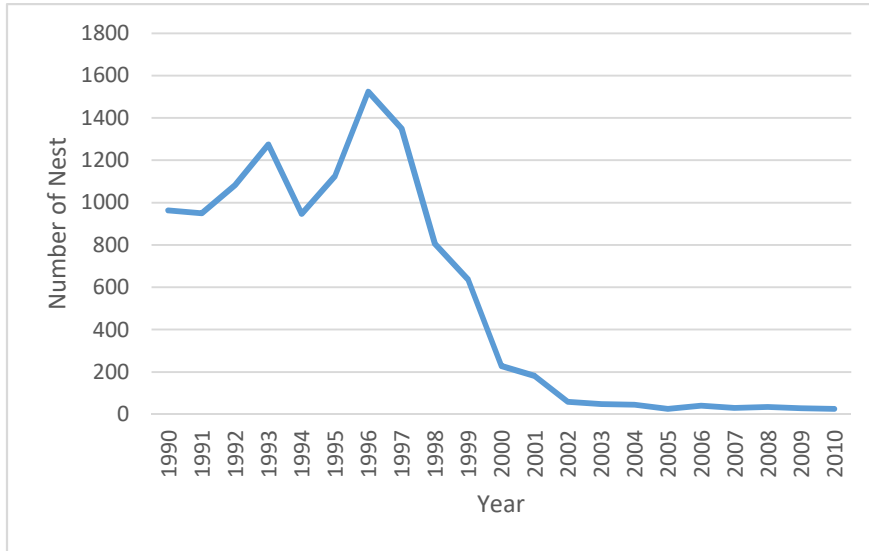
**Figure 1.** The Perak River map (Ismail et al., 2018) showing the population study sites (Inset: Map of Peninsular Malaysia).



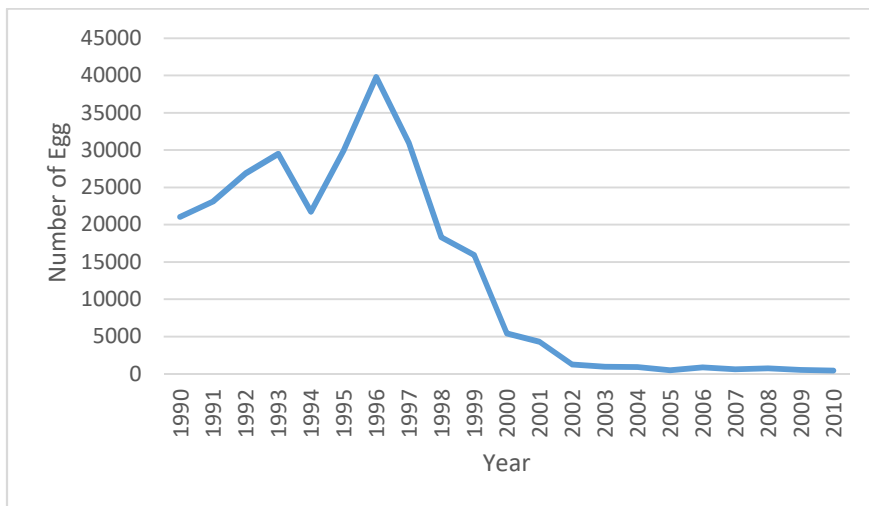
**Figure 2.** *Batagur affinis* hatchlings.

### 3. Results

The data recorded from the years 1990 to 2010 on the total numbers of nest and egg reflected the decline of terrapin populations in Perak River, Malaysia. However, the total numbers of nest and egg recorded the highest in 1996 with a total number of 1524 and 3908 respectively. Oppositely, the lowest number of nests recorded was 25 recorded in 2005 whereas the lowest number of eggs was 465 recorded in 2010. These recorded numbers are depicted in Figures 3 and 4. It is notable that the average number of the nest was  $543.19 \pm 542.75$  while the average number of eggs was  $13038.14 \pm 13329.59$ .



**Figure 3.** The number of River Terrapin nests recorded from the years 1990 to 2010.



**Figure 4.** The number of eggs collected from the years 1990 to 2010.

#### 4. Discussion

Based on the nesting records provided by DWNP, Moll (1980) revised and estimated that there were between 401 and 1204 females remained in the natural habitat, which was more than that previously believed. Thus, by assuming that the females constitute approximately 33% of the total Perak River population, the total population of river terrapins could number in the range between 1200 and 3600 (Moll, 1980).

On the other hand, based on the collected egg data, it is notable that there was a significant decline in the numbers of female *B. affinis* nesting along the Perak River (Kasinathan et al., 2016). The reason for this observation is unclear; however, it obviously showed that these terrapins were surviving

to augment the breeding population. This situation calls into a question about the effective population management and conservation strategies taken by the DWNP. Since the head-starting programs have failed to achieve even basic population recovery goals, Platt et al. (2008) recommended a rigorous evaluation of their conservation merits before additional assets could be expended.

The records from recent years showed that upstream dam construction and tin mining operations on the Perak River have intensified and might be resulted in significant changes to the river morphology. A survey completed by Moll (1980) indicated that *B. affinis* inhabit tidal sections of the Perak River throughout the year except during the nesting season. The river mouth is widely associated with muddy bottom in most places, although sandy areas do occur at several locations along the river.

#### **4.1 Recommendations for the conservation program**

Moll and Moll (2004) recommended the establishment of protected areas as an effective methodology in conserving the river terrapin. If Perak River is to be declared as a protected area, it has two key advantages for the entire natural ecosystem. Firstly, the habitat and community can remain intact and secondly, all stages of the life history of river terrapin can be protected and then get mature naturally. Additionally, it is highly recommended that all the Perak River beaches should be gazetted as a wildlife sanctuary to promote safer nesting areas for the terrapin population. As usual, the entire ecosystem should be protected and enforced by the DWNP. Human activities such as hunting, fishing or removal of native plants should not be allowed. Therefore, it is important to establish a buffer zone around the river to control and to avoid speedboat traffic from being in contact with the population niches. As a routine, scheduled clearing vegetation on nesting beaches is also highly encouraged.

### **5. Conclusions**

After the year 1996, the breeding performance was declining year by year. This directly evidenced that DWNP needs new approaches to tackle the problems associated with this species in the wild and captivity. Despite various conservation actions being taken in the past, the recovery is still far from satisfactory; a vital necessity is to compile their data such as behaviour, diet, ecology, and also genetics to be used in designing new effective management strategies.

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**Appendix.** Nests and Eggs Data Collections from the years 1990 to 2010

No	Year	Number of Nests	Number of Eggs
1	1990	963	21049
2	1991	949	23119
3	1992	1082	26880
4	1993	1275	29491
5	1994	947	21717
6	1995	1125	29944
7	1996	1524	39808
8	1997	1351	30965
9	1998	806	18292
10	1999	636	15918
11	2000	229	5419
12	2001	181	4323
13	2002	59	1240
14	2003	48	963
15	2004	45	913
16	2005	25	487
17	2006	41	894
18	2007	31	625
19	2008	35	765
20	2009	29	524
21	2010	26	465